

WASHINGTON DEPARTMENT OF ECOLOGY
ENVIRONMENTAL ASSESSMENT PROGRAM
FRESHWATER MONITORING UNIT
STREAM DISCHARGE TECHNICAL NOTES

STATION ID: 19E060
STATION NAME: Deep Creek
WATER YEAR: 2005
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Introduction

Watershed Description

The Deep Creek watershed contains one of three stations in the Intensively Monitored Watersheds (IMW) project Strait of Juan de Fuca complex. The stream is approximately 7.9 miles long, the basin area is 17.3 square miles. Watershed elevations range from sea level to 3,020 feet. Precipitation falls primarily as rain between October and May, averaging 86 inches annually. Crescent formation volcanic rocks in the upper watershed, and marine sedimentary rock overlain by terraces of glacial deposits in the lower watershed, coarsely define the complex geology of the watershed. The primary land use for the last century has been commercial forestry. Three vegetation zones define the basin--Sitka pruce in the valley bottoms, Western hemlock in the low to mid elevations, and Silver fir in the headwaters. The fish species present include Coho salmon, chum salmon, steelhead or rainbow trout, cutthroat trout, Pacific lamprey, western brook lamprey, torrent sculpin, and reticulate sculpin.

Gage Location

The gaging station for Deep Creek is located in Clallam County, Washington, approximately 27 miles west of Port Angeles. Deep Creek is a tributary to the Strait of Juan de Fuca. The gage, placed on the left bank, is on the downstream side of the Highway 112 bridge at approximately river mile 0.2. The stage record is tidally influenced. Tidal spikes in the stage record are removed.

Table 1.

Drainage Area (square miles)	17.3
Latitude (degrees, minutes, seconds)	48 10 21 N
Longitude (degrees, minutes, seconds)	124 01 36 W

Discharge

Table 2. Discharge Statistics.

Mean Annual Discharge (cfs)	57
Median Annual Discharge (cfs)	31
Maximum Daily Mean Discharge (cfs)	462
Minimum Daily Mean Discharge (cfs)	2.1
Maximum Instantaneous Discharge (cfs)	586
Minimum Instantaneous Discharge (cfs)	1.9
Discharge Equaled or Exceeded 10 % of Recorded Time (cfs)	137
Discharge Equaled or Exceeded 90 % of Recorded Time (cfs)	3.7
Number of Days Discharge is Greater Than Range of Ratings	12
Number of Days Discharge is Less Than Range of Ratings	0

Note: Statistics displayed in Table 2 may not include values in which the predicted discharge exceeds the range of ratings.

Narrative

Twelve of the highest days in the predicted discharge record were excluded from some statistics in Table 2. The mean annual discharge, median annual discharge, maximum daily mean discharge, and maximum instantaneous discharge in Table 2 are less than the actual values. On part or all of seven days, well-correlated regressed stage data from adjacent gaging stations were used to predict discharge. On part or all of twenty days in November and December, estimated data predicted discharge.

Error Analysis

Table 3. Error Analysis Summary.

Logger Drift Error (% of discharge)	d/n/a
Weighted Rating Error (% of discharge)	9.1
Total Potential Error (% of discharge)	d/n/a

Rating Table(s)

Table 4. Rating Table Summary

Rating Table No.	1	2	
Period of Ratings	10/01-01/22	01/17-09/30	
Range of Ratings (cfs)	1.3-602	1.3-602	
No. of Defining Measurements	6	7	
Rating Error (%)	9.1	9.0	

Rating Table No.			
Period of Ratings			
Range of Ratings (cfs)			
No. of Defining Measurements			
Rating Error (%)			

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Period of Ratings			
Range of Ratings (cfs)			
No. of Defining Measurements			
Rating Error (%)			

Narrative

Rating Table 1, the first rating developed for the Deep Creek gaging station, covered the beginning of water year 2005. A moderately large storm event in late January filled the control, resulting in a fairly significant shift in the middle and lower portions of the rating curve. Rating 1 transitioned completely to rating 2 on January 22. Rating 2, coupled to the stage record, predicted discharge at Deep Creek for the remainder of the water year.

Stage Record

Table 5. Stage Record Summary

Minimum Recorded Stage (feet)	1.08
Maximum Recorded Stage (feet)	7.78
Range of Recorded Stage (feet)	6.70
Number of Un-Reported Days	12
Number of Days Qualified as Estimates	20
Number of Days Qualified as Unreliable Estimates	0

Narrative

The stage record at Deep Creek is continuous and complete for water year 2005. Due to rating curve exceedances, twelve days were excluded from being used to predict discharge. Twenty days were qualified as estimated data. Complete data gaps caused by equipment failure encompassed all or parts of 7 days. These gaps were filled using regressed, well-correlated stage data from one or more stations. Tidal spikes embedded within the stage data were manually removed from the record. Relatively minor discrepancies between the recorded stage value and the observed primary gage index (a staff gage) were resolved by filter adjusting the record.

Modeled Discharge

Table 6. Model Summary

Model Type (Slope conveyance, other, none)	none
Range of Modeled Stage (feet)	
Range of Modeled Discharge (cfs)	
Valid Period for Model	
Model Confidence	

Surveys

Table 7. Survey Type and Date (station, cross section, longitudinal)

Type	Date
station	09/26/2005

Activities Completed

The survey conducted on September 26, 2005, confirmed that the staff gage had not moved since installation in June 2004.